

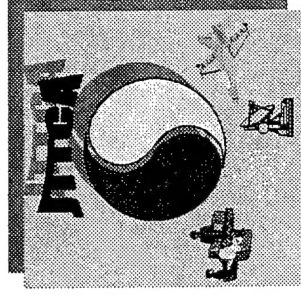
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The Joint Test and Training Capability Assessment



Assessing High Level Architecture (HLA) and Training Systems for T&E Use

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Patuxent River, MD

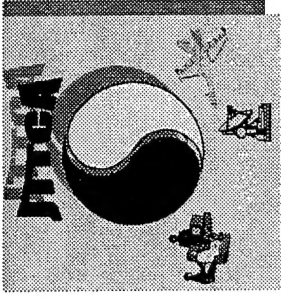


Project Objectives

The Joint Test and Training Capability Assessment (JTTC) project is sponsored by the OSD Central Test and Evaluation Investment Program (CTEIP). The JTTC project has two main objectives:

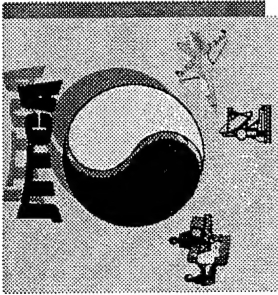
1. Assess the Joint Tactical Combat Training System (JTCTS) for T&E applications.
2. Assess the DoD High Level Architecture (HLA) for T&E applications by enabling interoperability among open-air range (OAR) assets and with a T&E simulation running in an Installed System Test Facility (ISTF).

This poster paper and demonstration addresses objective 2--- assessing HLA for T&E applications. The JTCTS is still under development. The JTTC project cannot assess JTCTS for T&E applications until JTCTS equipment is available for assessment.



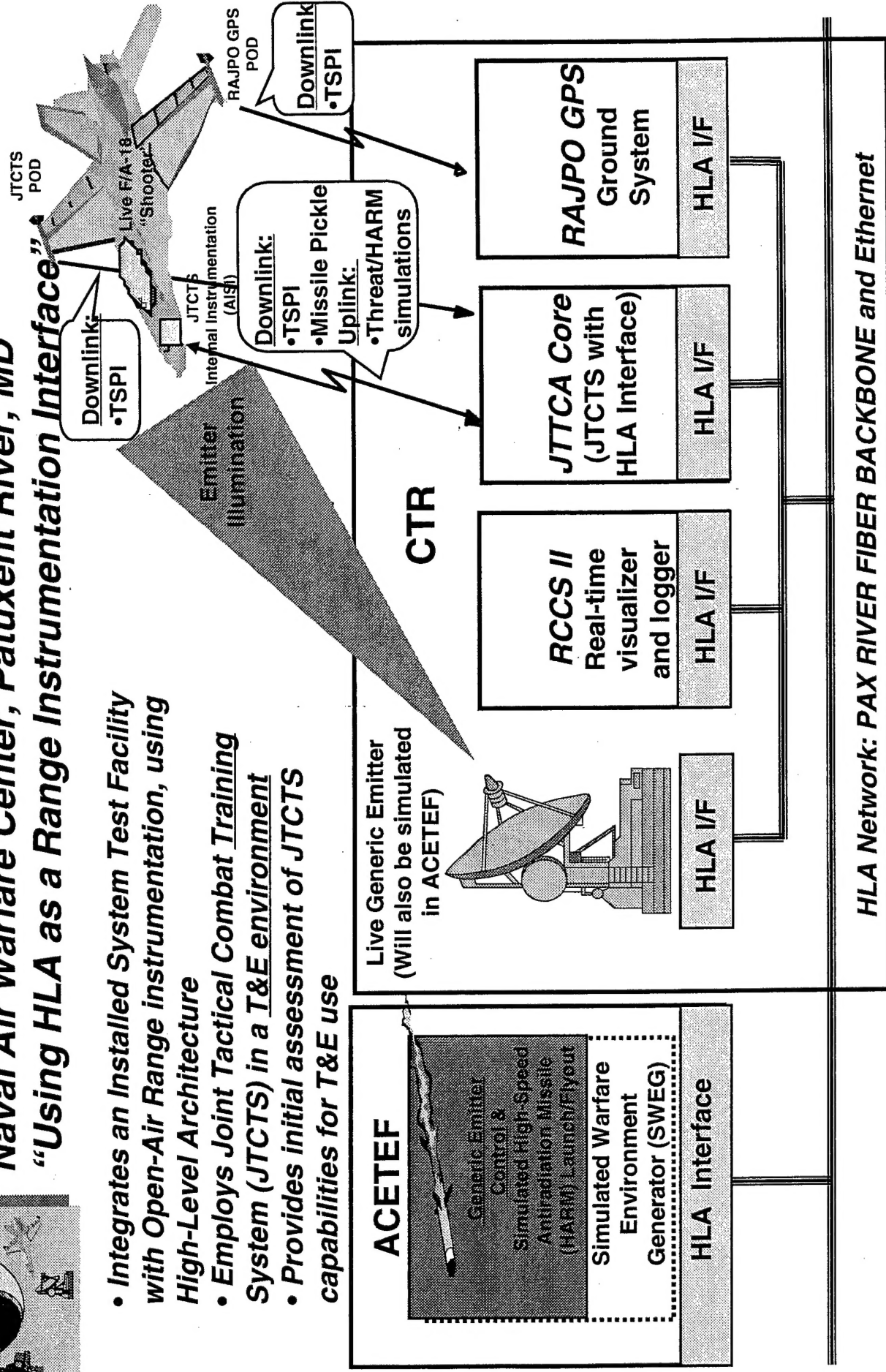
Assessment Methodology

- To assess HLA in a T&E environment including an open-air range (OAR) and an installed system test facility (ISTF), the JTTCAL team designed and implemented the JTTCAL HLA federation at the Naval Air Warfare Center Aircraft Division (NAWCAD), Patuxent River, MD.
- The JTTCAL HLA federation includes federates within the Atlantic Test Range (ATR) open-air range and the Air Combat Environment Test and Evaluation Facility (ACETEF) Installed System Test Facility .
- ATR and ACETEF are part of the Atlantic Ranges and Facilities complex at Patuxent River, and are located several miles apart. They are interconnected via the Aircraft Interoperability Center (AIC) fiber-optic OC-12 link.

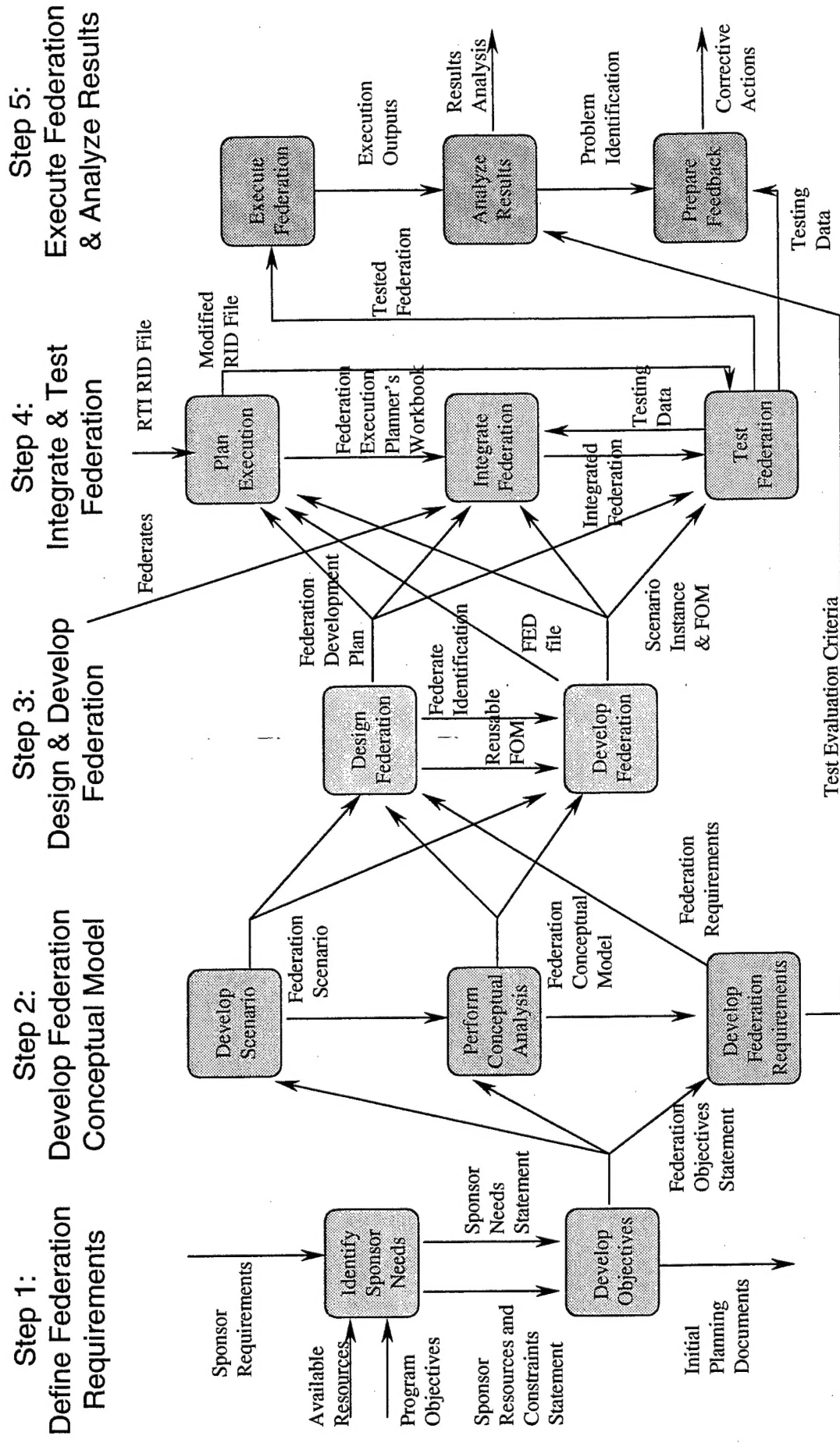


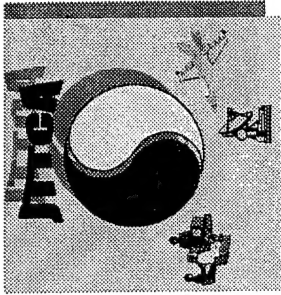
Joint Test and Training Capability Assessment (JTTC) **OAR/ISTF HLA Exercise at Chesapeake Test Range,** **Naval Air Warfare Center, Patuxent River, MD** **"Using HLA as a Range Instrumentation Interface"**

- Integrates an Installed System Test Facility with Open-Air Range instrumentation, using High-Level Architecture
- Employs Joint Tactical Combat Training System (JTCTS) in a T&E environment
- Provides initial assessment of JTCTS capabilities for T&E use



JJTCA Federation Development: JJTCA FEDEP Model (V1.2)

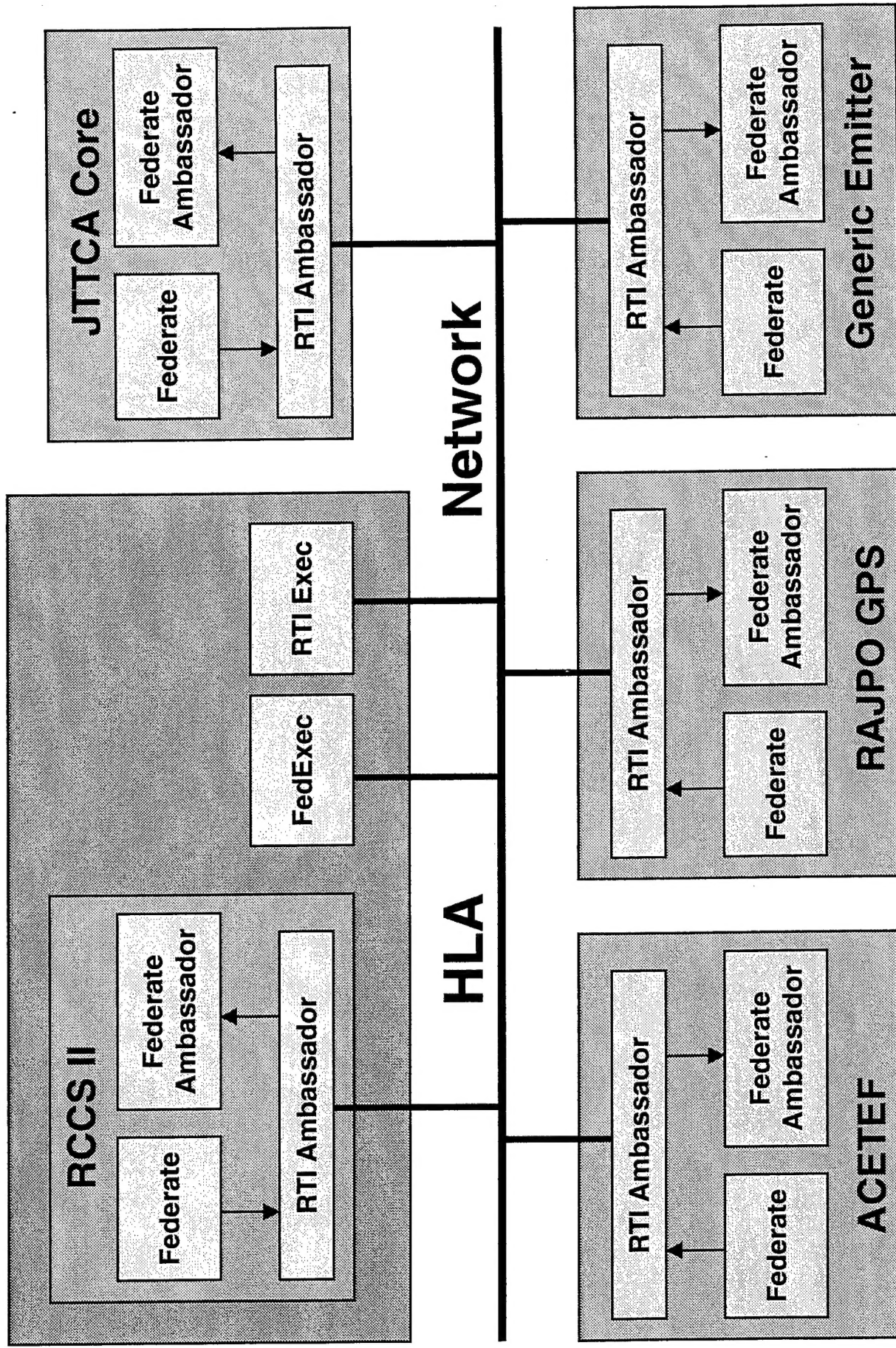


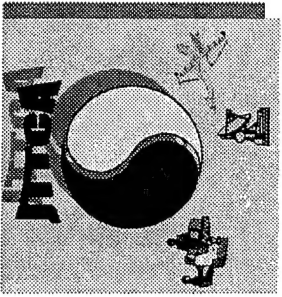


Three JTTC Tests

- **Combined Gateway Testing (CGT): Completed January, 2000**
 - Tested the ability of the JTTC Federates to function as an integrated High Level Architecture (HLA) Federation with a simulated JTTC Core Federate (JCF). The JCF is the JTTC functional configuration of the JTCTS Mobile Core.
 - Assessed the performance of HLA in the Test and Evaluation environment of Atlantic Ranges and Facilities, Patuxent River, Maryland.
 - The CGT showed that the JTTC Federates can be integrated using HLA rules and tools to perform a pre-planned test scenario. The CGT included integrating the JTTC Federates such that data was interchanged between them in near real-time using HLA protocols. Interchanged data included Time-Space Position Information (TSPI) data, weapon fire signals, weapon detonate signals, and emitter mode change commands. Completion of the CGT indicated readiness to proceed with the FEET.
- **Federation End-to-End Test (FEET): Completion TBD**
 - Tests the ability of the JTTC Federates to function as an integrated HLA Federation, including the actual JCF – i.e., a JTCTS Mobile Core with the HLA interface.
- **Live Open-Air Exercise (LOAE): Completion TBD**
 - Tests the ability of the JTTC Federates to function as an integrated HLA Federation, including the actual JCF, in an exercise scenario with a live aircraft flying on the Atlantic Test Range.
 - Tests and assesses the capabilities of the JCF and JTCTS data link to function in a live Test and Evaluation exercise scenario.

JTTCA HLA Federation





Test Data Collection, Analyses and Results - the JTTCALog Partial Test and Assessment Report (PTAR)

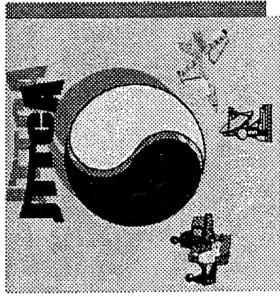
Data Collection

- For each test run, all HLA data transmitted or received by each federate was collected in a separate binary log file by an HLA data logger.
- The HLA data in the binary log files was processed after the test runs using a log file reader application, called the *JTTCALog File Reader*, which was developed in-house.
- The JTTCALog reader has a graphical user interface (GUI) which allows data to be selected for analysis using a set of user-selectable filters. The reader generates human-readable ASCII files that were analyzed in different ways to achieve the goals of the particular data analyses.

Analyses

- Examined the test run data at a high level
- Interface compliance document analysis: Examined sample data at a very low level
- Other analyses: Examined the data with respect to timing and message transfer reliability

Results were documented in the PTAR



JTTC Federation Analyses

During CGT, the following analyses were conducted, then documented in the PTAR:

- **Overall Analysis**
- **Data Periodicity Analysis**
- **Time Stamp Considerations**
- **Time Order Analysis**
- **Message Transfer Reliability Analysis**
- **Message Transfer Latency Analysis**
- **Overall Conclusions and Recommendations**



Evaluations and JTTC Test Report Availability

During CGT, the following evaluations were conducted, then documented in the PTAR:

- Evaluation of FEDEP Model 1.2
- Evaluation of DMSO Tools
 - Object Model Development Tool (OMDT) Editor 1.3v4
 - Federation Execution Planner's Workbook (FEPW) Editor 1.3v3
- Evaluation of the JTTC Log File Reader
- Evaluation of the Ease of HLA Implementation
- Evaluation of Reusability of the HLA Federation Design
- 22 "HLA lessons learned" were documented in the PTAR
- JTTC Test Report (PTAR) is available electronically (MS Word file) to U.S. government agencies and their contractors by e-mailing Mike Payne at payneML@navair.navy.mil
- Requests from other organizations can be made in writing to:
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Maryland 20670-1547.

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